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February 15, 1996

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Ms. Sally Safioles
Washington Department of Ecology, NWRO
3190 160th Avenue S.E.
Bellevue, WA 98008-5452

Re: Responses to Ecology's Comments on Pier 91 Closure Plan

Dear Ms. Safioles:

This letter provides responses to Ecology's November 29, 1995 comments on the Burlington Environmental Inc. (d.b.a. Philip Environmental) Pier 91 Facility Final Status Closure Plan. The closure plan has been revised in response to these comments. A copy of the revised closure plan is attached for your review.

Ecology's General Comments

1) The plan should emphasize the performance standards for clean closure of above-ground structures and the mechanisms to address subsurface contamination. These two issues are critical to the overall strategy on how to address RCRA closure and corrective action.

Response: *Agreed. The performance standard for clean closure of above-ground structures is the use of high-pressure water spray to achieve MTCA Method B (or Method A, as appropriate) cleanup levels for soils. Corrective Action under either RCRA Subpart S or MTCA will address any residual soil and groundwater contamination. The closure plan has been revised to clarify these points.*

2) The performance standards for clean closure are MTCA residential exposure standards as stated in WAC 173-303-610(2)(b). As indicated in the regulations, primarily MTCA Method B is used, although Method A may be used as appropriate (such as TPH). All concrete sampling and analyses must meet the Method B or A standard for soils.

Response: *Comment noted (see above response). The sampling conducted during interim status closure activities at the Pier 91 facility indicates that MTCA Method B and A standards for soils can be achieved on decontaminated concrete surfaces.*

3) The closure plan only addresses above ground structures, which is appropriate at this stage. However, it should be clear in the closure plan that RCRA Corrective Action will address subsurface contamination (including the concrete containment). It should also be clear that if clean closure or corrective action cannot address residual contamination of groundwater and soil, then a post-closure plan and permit

will be required. Financial assurance will be required for all phases that are needed prior to removing the facility from the requirements of RCRA.

Response: *The regulations under both RCRA and MTCA require post-closure permitting and financial assurance if cleanup to some level cannot be met. However, the Pier 91 facility situation is complex, in that while Philip operated (not owned) the RCRA facility several years, many other companies have operated this facility for a much longer period than Philip did. These previous operations constitute the most significant contributors to the existing soil and groundwater contamination at the site. Establishing financial assurance prior to enjoining the other PLPs and actually attempting to clean up the site is inappropriate and should not be the sole burden of Philip. Philip is already under a RCRA 3008(h) order at the Pier 91 facility. A MTCA order can be used to replace the 3008(h), and when issued would address financial assurance responsibilities for all of the PLPs at the site.*

4) Burlington needs to provide information within this closure plan to address SWMU #2, the Oil/Water Separator. Since all of the above-ground portions of the facility will be closed and no longer controlled by Burlington, this unit must be accounted for. Any potential contamination associated with this unit will be handled under corrective action, but the actual unit must meet the performance standards for closure just as the load/unload area should.

Response: *The oil/water separator was an interim status unit that was decontaminated in 1989. This unit will be sampled for verification of decontamination when re-sampling is completed in the warehouse < 90 day area and east portion of the small yard. Concrete chip samples will be analyzed for total metals, BTEX, PCBs, SVOC, and TPH. Closure verification sampling of the oil/water separator has been included in the final closure plan.*

Ecology's Specific Comments

1) Section I1.1, Page 3. Please provide closure dates on the items that were closed under the Interim Status Closure Plan.

Response: *Closure dates have been included in the plan.*

2) Section I1.1, Page 3. The Part B closure plan included concrete core samples from areas of the facility covered with new concrete to verify that the old concrete was properly decontaminated. The revised plan does not include these samples. These samples should be retained in the revised plan.

Response: *Attempting to obtain samples from the surface of the old concrete would not be useful or appropriate for several reasons: (1) it would not be technically feasible to clearly identify, sample and analyze the horizon of the old concrete, as new concrete was poured directly on top of the old to slope the surface prior to coating; (2) because the surface of the old concrete was decontaminated prior to pouring the new concrete (using the same procedures that have proven effective in the interim status areas), it is unlikely that any substantial contamination was remaining; (3) The old concrete surface was completely encapsulated by the new coated concrete, and is not likely to be contaminated by further operation of the facility; (4) sampling of the concrete in this area should be minimized* *because it would damage the existing coating which provides enhanced containment for the still operational tank farm; and (5) it is the intent of this closure plan to address the bulk concrete containment structures under appropriate corrective action mechanisms.*

3) Section I1.2, Page 7. It should be acknowledged that MTCA residential exposure standards for soils will be the performance standard (WAC 173-303-610(2)(b) to be met in any sampling and analysis for concrete samples.

Response: *Agreed. The closure plan has been revised accordingly.*

4) Section I1.4, Page 9. In the table it would be helpful if dates were included on tasks that have actually been completed. Please provide the month and year each task was completed. On Page 10 it is stated that the secondary containment for Tank 164 has been completed; that should also be included on table. Since there are a number of areas to undergo closure (Tank 164, secondary containment in the small yard and the load/unload area) it would be helpful to break out specific areas. This table appears to only address Tank 164 and the small yard area.

Response: *Comment noted. The closure plan has been revised accordingly.*

5) Section I1.5.2, Page 13. All cracks/gaps and stains should be thoroughly mapped for potential biased sampling sites for concrete or subsurface sampling.

Response: *Philip agrees to assess the load/unload area for the presence of cracks and obtain two additional biased samples if cracks are present. However, mapping stains on the load/unload pad is inappropriate because PNO has been using this area for product storage since Philip decontaminated it in mid-1995. If any staining were present, it would be attributed to the actions of a third party. The load/unload pad will be sampled as required in the closure plan to verify decontamination was complete. And, as described in the closure plan, if any sampling points fail to meet closure standards, decontamination, sampling and analytical procedures will be repeated until standards are met.*

The fact that the concrete in the Small Yard (Tanks 109-112, 164 area) is coated precludes the need to assess cracks in the concrete in this area. Philip's preventative maintenance program was designed to identified surficial cracks in the coating. Any cracks that were found were consistently sealed upon discovery, and cracks in the coating are not necessarily associated with cracks in the underlying concrete. Mapping of stains in this area is inappropriate for the reasons described in the previous paragraph.

6) Section I1.5.3, Page 14 and 15. Additional biased samples will need to be collected in response to comment number 5. A method or criteria for selecting which sample to collect should be included in the plan. Also, VOCs should be collected on some of the samples. During the Interim Status Closure, VOCs were not required; but since this is for final closure, some VOC samples are needed to verify that the cleaning of the secondary containment within the small yard has been accomplished. This closure plan covers the areas where dangerous wastes were handled. Even though the sampling procedure may cause significant volatilization, some samples need to

be collected to verify this. Field QA/AC samples (such as field duplicates) should also be collected and specified in this closure plan.

Response: *See above comment regarding the need for additional biased sampling. VOCs were not required in interim status closure sampling because they are not representative of the types of materials historically managed at the Pier 91 facility. These sampling parameters were sufficient to demonstrate closure under interim status, and are sufficient to demonstrate closure under final status. Also, the coating used on the concrete secondary containment around Tanks 164 and 109-112 likely contains VOCs. If some of the coating was present in the concrete sample, cleanup standards would not be achievable for VOCs. As was the case for the interim status areas, Philip contends that VOC analyses are not warranted to verify clean closure of final status areas.*

7) Section I1.5.3, Page 15. The clean closure standard for concrete will be MTCA Method B/A for soils. The analytical detection limits must quantify those standards. In Appendix I-5, there is a table showing some of the constituents and laboratory detection limits. An additional column should list the relevant MTCA B or A standards. All organic compounds should also be listed with detection limits or acceptable PQLs that the laboratory will be required to meet. The performance standards should be provided to the laboratory to insure adequate quantification.

Response: *Agreed. However, rather than revising Appendix I-5, the relevant MTCA B or A standards will be included on all analytical reports.*

8) Section I2.0, Page 16. It should be acknowledged that if clean closure or corrective action cannot address residual contaminated soil, groundwater or concrete, then a post-closure permit and financial assurance will be required. Please revise this section to account for this contingency, as stated within your interim status closure plan.

Response: *Comment noted. The closure plan has been revised accordingly. Also refer to the response to General Comment #3.*

9) Section I3.0, Page 20. The sampling and analysis cost should include additional biased sampling.

Response: *Comment noted. The cost of two additional biased samples in the load/unload area have been included in the closure plan.*

10) Section I4.0, Page 21. Burlington will need to make some post-closure financial assurance mechanism available. At present Burlington is only addressing the above-ground portions of the facility under the final facility closure plan. Corrective action was intended to be completed prior to final closure. At that time the need for Post Closure would have been addressed. Since final closure is not addressing the below ground contamination at the site and there is not yet any corrective action mechanism in place that addresses financial assurance, some form of financial assurance is necessary. Please provide post-closure cost estimates based on existing conditions and the financial mechanism that will be used to cover these

potential costs as required by WAC 173-303-640(8). A provision can be made to delete this requirement once a corrective action mechanism is in place for the facility. Some form of financial assurance will need to be provided in order to bridge the gap between closure and corrective action.

Response: *Please see response to General Comment #3.*

11) Section I5.0, Page 22. Until the need for Post Closure care has been determined, the need for deed restrictions is not yet known. Please provide wording within this section that accounts for this possibility.

Response: *Philip is not the owner of the property, and therefore has no ability put deed restrictions into place on this property.*

12) Appendix I-6, Page 2. No map was attached showing concrete sampling points. Please provide an enlarged figure showing the secondary containment area of the small yard in which dangerous waste was handled and the load/unload area; also show, at a minimum, the location of sumps for biased sampling and the anticipated random sample location. The additional biased sample will need to be determined in the field based on the number of cracks/gaps/stains.

Response: *Comment noted. A map showing concrete sampling locations has been included in Appendix I-6.*

If you have any questions regarding this submittal, please feel free to call me at (206) 227-6121 or Keith Lund at (206) 227-7527.

Respectfully,

John Stiller
Regulatory Affairs Manager

Enclosure (revised closure plan)

cc: Dave Bartus, EPA Region 10
Gerald Lenssen, Ecology HQ

SECTION I

CLOSURE PLAN AND CLOSURE COST ESTIMATES

SECTION I. CLOSURE PLAN AND CLOSURE COST ESTIMATES

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40 CFR 264 Subparts G and H
WAC 173-303-806(4)(a)(xiii), 610

I1.0 CLOSURE PLAN

40 CFR 270.14 (b)(13), 264.112
WAC 173-303-806(4)(a)(xiii), 610(3)
Revised PRMOD8-2

This closure plan describes the procedures that Burlington Environmental Inc. (d.b.a. Philip Environmental, hereafter referred to as "Philip") will follow to close the dangerous waste management units at the Pier 91 Facility. Closure activities will be performed in accordance with WAC 173-303-806, 610, 630 and 640 and 40 CFR 264 Subparts G and H. The closure requirements for waste piles, surface impoundments, land treatment, landfills or incinerators do not apply to the Philip Pier 91 Facility.

I1.1 Facility Description

Revised PRMOD8-2

USEPA/Ecology Facility Identification Number: WAD000812917

Operator's Name:	Burlington Environmental Inc. (d.b.a. Philip Environmental)
Address:	1100 Oakesdale Avenue Southwest Renton, Washington 98055
Telephone Number:	(206) 227-0311

Plant Name:	Burlington Environmental Inc. (d.b.a. Philip Environmental) Pier 91 Facility
Address:	2001 West Garfield Street Pier 91, Port of Seattle Seattle, Washington 98119
Telephone Number:	N/A

The Philip Pier 91 Facility is located at 2001 West Garfield Street, Pier 91 in the Port of Seattle, King County, Washington. Land use for the facility is permitted and zoned by the City of Seattle as General Industrial Zone 1, with a 45' height limit (IG1 U/45). The Pier 91 Facility is a 4-acre site previously used by Philip for waste oil recovery and blending and for tank storage and treatment of dangerous wastes.

With the advent of the RCRA regulations in 1980, Philip submitted a Part A application designating the entire site as an interim status dangerous waste management facility. The interim status facility consisted of numerous tanks in three separate tank yards (Black Oil Yard, MDO Yard, and Small Yard). Philip submitted a Part B permit application in 1988, which included plans for numerous proposed units that were never constructed.

Ecology issued a Part B permit for the facility in 1992. The permit required Philip to submit a closure plan to address the interim status areas that were not covered by the Part B closure plan. Ecology approved the interim status closure plan in 1995, and Philip has implemented the procedures described therein.

Typical wastestreams processed at the Pier 91 Facility included waste oils, oil and coolant emulsions, industrial wastewaters, and industrial waste sludges. In general, these wastestreams were treated in tanks by oxidation, reduction, demulsification, precipitation, neutralization, and heat treatment processes.

Philip has ceased operations at the Pier 91 Facility. The purpose of this plan is to address closure of the existing units that were not addressed in the interim status plan. The following is a summary of closure activities that have been conducted to date, the applicable closure mechanism for each activity, and the issues that remain to be addressed under a MTCA order cleanup. Also refer to Figure I1-1, Site Plan / Summary of Closure Activities.

Items addressed under *<u>Interim Status Closure Plan:</u>*	*Date of* *<u>Decontamination</u>*
▪ Black Oil Yard Tanks & Ancillary Equipment	
90	February, 1991
91, 92	n.a.*
▪ MDO Yard Tanks & Ancillary Equipment	
93, 95, 101-104, 113	n.a.*
94, 96-100	June-October, 1990
▪ Small Yard Tanks & Ancillary Equipment	
105-108	December, 1989-January, 1990
109-112	October, 1994-January, 1995
113	n.a.*
114	January, 1990
115-118, 165	August, 1994
▪ Black Oil Yard Concrete Surface	August, 1995
▪ MDO Yard Concrete Surface	July, 1995
▪ Small Yard Concrete Surfaces	
(105-108 area, 113-118 area)	August, 1995

*(PNO product tanks, always in non-DW service)

<u>Items addressed in this plan (not covered in Interim Status Closure Plan):</u>

- Small Yard Tank 164
- Small Yard concrete top surface (109-112 and 164 area)
- Load/Unload pad concrete surface
- Oil/water separator concrete surface

*Note: although much of this work has been completed (e.g., inventory elimination, tank decontamination, and concrete decontamination), cost estimates for these activities are provided in this closure plan.

<u>Items to be addressed under MTCA order cleanup:</u>

- Subsurface contamination (including soil, groundwater, and concrete containment structures)

11.2 Closure Performance Standards

40 CFR 264.111, 264.115, 264.178, 264.197
WAC 173-303-610(2)(a)(i),(ii),(iii), (b), (6)
Revised PRMOD8-2

Ecology has determined that the performance standards for demonstrating clean closure at the Pier 91 Facility are MTCA residential exposure standards as stated in WAC 173-303-610(2)(b). All concrete sampling and analyses must meet the appropriate Method B or A standard for soils. This closure plan addresses above-ground structures only (i.e., tanks and concrete top surfaces). Subsurface contamination (i.e., soil, groundwater, and bulk concrete containment structures will be addressed by a MTCA order cleanup). In general, closure activities are designed to:

- Minimize the need for further maintenance.
- Control, minimize or eliminate to the extent necessary to protect human health and the environment post-closure escape of dangerous waste, dangerous constituents, leachate, contaminated run-off, or dangerous waste decomposition products to the ground, surface water, ground water or the atmosphere.
- Return the land to the appearance and use of surrounding land areas to the degree possible given the nature of the previous dangerous waste activity.

Other closure policies and procedures follow:

- A copy of the approved Closure Plan, and subsequent authorized amendments, will be maintained at the corporate office until closure is complete and certified.
- Changes in facility plans, operations or scheduling may result in an amended Closure Plan. Amended versions will be submitted to the Washington Department of Ecology (Ecology) with a written request for a permit modification as identified in WAC 173-303-610(3)(b).
- Philip will notify Ecology at least 10 days prior to any closure performance sampling events.

FIGURE II-1 SITE PLAN / SUMMARY OF CLOSURE ACTIVITIES

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- Sequential closure of the dangerous waste management units will be followed for closing the entire facility. Refer to Section I1.5, Closure Activities, for a description of the closure procedures for individual waste management units and Section I1.4, Closure Schedule, for the timing of these activities.
- Philip intends to use trained employees for closing the various units. However, facility closure cost estimates are based on third party costs (see Section I3.2, Unit Costs for Closure Activities).
- The facility will remain fenced and security procedures will be followed during closure activities. Refer to Section F1.0, Security Procedures and Equipment.
- At all times during closure activities, the required and applicable standard operating procedures for proper dangerous waste management and worker health and safety will be followed.
- All dangerous waste storage and treatment tanks and associated equipment, piping and instrumentation will be either decontaminated and salvaged or dismantled and disposed of at an off-site RCRA-permitted facility.
- All mobile or fixed equipment that has been used to process or handle dangerous wastes will be cleaned, decontaminated and re-used or salvaged, or if necessary disposed of at an off-site RCRA-permitted facility.
- The requirements of the Department of Transportation (DOT) 49 CFR will be followed for transporting any dangerous wastes or other equipment or materials off site.
- Closure activities at the Philip Pier 91 facility are designed to meet Federal and State closure performance standards. The closure activities will comply with the closure requirements of Subpart G of 40 CFR 265, WAC 173-303-400(3)(c)(ix) and WAC 173-303-610(2).
- Decontamination residues and waste materials generated from closure activities will be handled as required by WAC 173-303-170 through 230.

- An independent registered professional engineer will monitor all closure activities to ensure they are conducted in accordance with the approved closure plan.
- Closure activities to be monitored by the independent engineer include inventory elimination, tank system decontamination, and secondary containment decontamination and sampling. The engineer will visit the facility at least weekly for approximately 6 to 8 hours. These inspections will be part of the facility's operating record.
- Philip will submit to Ecology certification that final closure of the facility has been conducted in accordance with the specifications of the approved closure plan. This certification will be signed by both Philip and an independent professional engineer. The certification will be submitted to Ecology within 60 days of completion of final closure.

I1.3 Maximum Waste Inventory

40 CFR 264.112(b)(2) and (3)
WAC 173-303-610(3)(a)(ii) and (iii)
Revised PRMOD8-2

The maximum waste inventory is based on the total capacity of Tank 164, which is the only existing tank that was not addressed in the interim status closure plan. Although this tank has been decontaminated and removed from the facility, the costs associated with inventory elimination and decontamination are included in this plan because this tank was not addressed in the interim status closure plan. The maximum waste inventory for the dangerous waste tank system is 14,810 gallons.

I1.4 Closure Schedule

40 CFR 264.112(b)(6),(7)
WAC 173-303-610(3)(a)(vii)
Revised PRMOD8-2

This section discusses the schedule for the final closure of the facility. As stated above, the majority of the facility has been closed under the approved interim status closure plan. Philip plans to conduct closure of the remaining units addressed in this plan in early 1996.

Although much of the closure work has been completed, cost estimates are stil presented in this plan. A summary of the closure activities addressed by this plan is presented below. The baseline date for the remaining closure steps is the date on which Philip notifies Ecology that sampling will be conducted.

Closure Step	Est. Time Required	Date of Completion
▪ Inventory Elimination (Tank 164)	step completed	July, 1995
▪ Tank Decontamination (Tank 164)	step completed	July, 1995
▪ Concrete Decontamination (109-112, 164 area, load/unload pad)	step completed	Aug., 1995
▪ Concrete Sampling and Analysis	three weeks after notification to WDOE	Week 3

I1.5 Closure Activities

40 CFR 264.112(b)(1),(3),(4)
WAC 173-303-610(3)(a)(i),(iv),(v)
Revised PRMOD8-2

This section describes closure activities for the waste management units at the Philip Pier 91 Facility.

Tank System Closure Procedure

40 CFR 264.197
WAC 173-303-640(5)

The tank system closure procedure consists of inventory elimination, decontamination, and sampling and analysis of secondary containment concrete. The dangerous waste inventory in Tank 164 was conducted as described in Section I1.5.1, Inventory Elimination. Tank 164 and surrounding secondary containment structures were decontaminated as described in Section I1.5.2, Decontamination Procedures. Although inventory elimination and tank/concrete decontamination procedures have already been conducted, these costs are included in the closure cost estimates.

I1.5.1 Inventory Elimination

40 CFR 264.112(3)
WAC 173-303-610(3)(a)(iv)
Revised PRMOD8-2

The only dangerous waste inventory addressed under this closure plan is the maximum storage volume of Tank 164 (14,810 gallons). This volume is used as the basis for determining the cost of inventory elimination. The actual inventory of Tank 164 was eliminated prior to decontamination of the tank. The pumpable portion was sent off-site to be blended into dangerous waste fuel, and the sludge was sent off-site for stabilization and disposal at a RCRA- permitted landfill.

I1.5.2 Decontamination Procedures

40 CFR 264.112(b)(4), 264.114
WAC 173-303-610(2)(b), (3)(a)(v), (5)
Revised PRMOD8-2

This section describes the decontamination procedures to be used for closure activities at the Philip Pier 91 Facility. The following are general decontamination policies.

- No equipment used in closure activities will be removed from the site until it has been decontaminated.
- All equipment, including the mobile equipment and earth moving equipment, which has come in contact with dangerous waste constituents during closure activities will be decontaminated before use outside the contaminated area.
- During closure, contaminated equipment, containment system components, structures and soils will be decontaminated for salvage or beneficial use, or disposed of at an off-site RCRA-permitted facility.
- Any residues generated during decontamination activities will be handled in accordance with all applicable requirements of WAC 173-303-170

through 173-303-230. Decontamination rinsate will be appropriately treated on-site using methods described in Section I1.5.1, Inventory Elimination.

- All decontamination will be done by scraping and cleaning with either high pressure water, steam or a caustic-type industrial cleaning solution until the equipment and materials show no visible evidence of contamination. The decontamination method an/or type of cleaning solution used will be selected based on the tank's previous contents and physical condition at the time of decontamination.

All tanks and associated pumps and piping will undergo decontamination at closure. The containment surfaces and the collection sumps of the dangerous waste tank system pad including the loading/unloading pad will also undergo decontamination. Additionally, all equipment used for closure activities will undergo decontamination. The secondary containment pads will also serve as decontamination staging areas during closure. Decontamination procedures for the dangerous waste management units and decontamination equipment are described below, along with decontamination rinsate management procedures.

<u>Tank System Decontamination</u>

The decontamination procedures discussed in this section will be used for all dangerous waste tanks in the tank system, and associated pumps and piping.

Tanks, pumps and piping will be triple rinsed using a high-pressure wash and an appropriate cleaning solution. Based on EPA guidance, rinsate is estimated to be generated at approximately 4 gallons per square foot for tanks and 50 gallons per pump for pumps and feedlines. (See <u>Final Report Guidance Manual: Cost Estimates for Closure and Post-Closure Plans (Subparts G and H), Volume III: Unit Costs</u>, Pope-Reid Associates, Inc., St. Paul, Minnesota for U.S. EPA, Washington D.C., November 1986.)

As an alternative, tanks and concrete may be cleaned in accordance with the Alternative Treatment Standards for Hazardous Debris, as described in 40 CFR 268.45 Table 1.

Rinsate and cleaning residue from decontamination procedures will be sent off-site for treatment and disposal at a RCRA-permitted facility. After decontamination, Tank 164 was transported to Philip's Tacoma Facility.

Decontamination of Containment Pads

Note: The procedures presented here were applied to the decontamination of the Small Yard (109-112 and 164 area) secondary containment concrete structures and the loading/unloading pad. All other concrete containment surfaces at the facility were decontaminated and sampled in accordance with identical procedures described in the approved interim status closure plan.

Philip has an inspection program (Section F2.0, Inspection Schedule) to ensure that cracks or gaps in containment pads are repaired. At the time of closure all containment pads will be inspected prior to decontamination. Cracks or gaps where run off could carry rinsate to the underlying soil will be filled and sealed to avoid contamination of the underlying soil. The crack sealant will be resistant to both water and any cleanser designated for use in the area.

Areas which show visual signs of past spillage will receive a preliminary cleaning with a wire brush or equivalent method. The containment pads will then be triple rinsed with a high pressure wash and an appropriate cleaning solution. Based on EPA guidance for tank system decontamination, rinsate is estimated to be generated at approximately 4 gallons per square foot. (See Final Report Guidance Manual: Cost Estimates for Closure and Post-Closure Plans (Subparts G and H), Volume III: Unit Costs, Pope-Reid Associates, Inc., St. Paul, Minnesota for U.S. EPA, Washington, D.C., November 1986.) This amount may vary depending upon the type of waste managed in the containment system, decontamination rinse method, and containment system size.

Rinsate and cleaning residue from decontamination procedures will be sent off-site for treatment and disposal at a RCRA-permitted facility, using methods described later in this section.

During the final decontamination stage, a small temporary decontamination area (approx. 10 feet by 20 feet) may be established on site once all concrete containment areas have been decontaminated. This area may be used for decontamination of sampling equipment, personal protective equipment, and other miscellaneous small equipment used during decontamination and sampling efforts. Releases from the temporary decontamination area will be prevented through use of a Visqueen ground cover (or equivalent material) placed as described above, and through proper management of decontamination rinsate and other materials to be sent off-site for treatment or disposal at a RCRA-permitted facility.

Equipment

All equipment used for closure will be decontaminated via scraping and triple rinsing with a high-pressure washer before transport off site or use elsewhere on site. Equipment decontamination will be performed in a specific decontamination staging area with adequate containment. All rinsate from decontamination will be collected and sent to an off-site RCRA-permitted facility.

I1.5.3 Containment Pad Sampling and Analysis

40 CFR 264.112(b)(4), 264.114
WAC 173-303-610(3)(a)(v), (5)
Revised PRMOD8-2

This section describes the sampling and analysis procedures to be used for closure activities at the Philip Pier 91 Facility. Philip will notify Ecology at least ten days prior to any closure performance sampling events.

After triple rinsing for decontamination is completed, the concrete surface of the containment area and related sumps will be sampled and analyzed to verify decontamination. Concrete chips will be collected to depth of 1/2 inch from the containment area surface at 16 biased and random sampling locations, as described below.

Samples to be analyzed will pass through a number 4 sieve. Sample collection, documentation and handling will be in accordance with standard procedures described in SW-846. Sampling locations are identified in Appendix I-6, Concrete Sampling Plan. The sampling plan will be available for review by the independent engineer certifying closure.

Random sampling will also be performed within the tank secondary containment area and within the loading/unloading area. Random sample locations will be selected in accordance with procedures described in Test Methods for Evaluating Solid Waste, SW-846, U.S. Environmental Protection Agency, November 1986. Random sampling locations within 5 feet of the biased sampling locations for sumps will be excluded from random sampling.

Concrete samples will be analyzed for semi-volatiles, total metals, PCBs, BTEX, and TPH. Table I1-1 summarizes the closure sampling plan for concrete containment pads.

The analytical results for the concrete chip samples will be evaluated for evidence of incomplete decontamination, i.e., that the closure performance standard has not been met. If analyses indicate contamination is still present in a containment area after completion of the steps described above, high-pressure washing may be repeated for that area until concrete chip sample analyses indicate sufficient decontamination of the containment pad. Steam cleaning or a blasting technique may be used as an alternate method for additional cleaning to decontaminate secondary containment areas.

Areas where analysis of concrete samples indicates contamination is still present will be resampled after additional decontamination is complete. Other areas not failing the closure demonstration will not be resampled. Analysis of the extra concrete samples taken after additional decontamination efforts will include only those constituents that failed closure in the initial sample set for that area.

TABLE I1-1. SUMMARY OF CONCRETE SAMPLING AND ANALYSIS

Revised PRMOD8-2

AREA	SAMPLES	ANALYSES
Small Yard concrete surface (109-112, 164 area)	2 random 5 biased (sumps)	semi-volatiles, total metals PCBs, BTEX, and TPH
loading/unloading area	1 random 1 biased (sump)*	semi-volatiles, total metals PCBs, BTEX, and TPH
oil/water separator	5 random	semi-volatiles, total metals PCBs, BTEX, and TPH

*If cracks in concrete are present in this area, up to 2 additional biased samples will be taken at crack locations. Costs for these samples have been included in this plan.

I2.0 POST-CLOSURE PLAN

40 CFR 270.14(b)(13), 264.118(a), 264.197(c)(2),(5), 264.228(1b),(c)(1)(ii), 264.258(b),(c)(1)(ii), 264.280(c), 264.310(b)
WAC 173-303-610(8)(a), 650(6)(b),(c)(i)(B), 655(8)(c), 660(9)(b),(c)(i)(B), 665(6)(b)

Philip has not operated dangerous waste disposal units at the Pier 91 Facility. The dangerous waste tank system at the facility includes adequate secondary containment, and thus will not be subject to the contingent post-closure plan requirements of 40 CFR 264.197(c)(2) and (c)(5). No dangerous waste residues or contaminated materials will be left in place upon final closure of the facility. Therefore, a post-closure plan is not provided at this time. Should ongoing corrective action not fully address soil and groundwater contamination, a post-closure permit could be required.

I3.0 CLOSURE COST ESTIMATES

40 CFR 270.14(b)(15), 264.142
WAC 173-303-806(4)(a)(xv), 620(3)

This section presents the closure cost estimates for the Philip Pier 91 Facility. The cost estimates are based on current unit costs for inventory elimination, decontamination, and sampling as described in Section I1.0, Closure Plan. Included are closure costs for each waste management unit described in the facility's Part B Permit Application.

As was the case with the approved interim status closure plan, for the purpose of calculating final closure costs, it is assumed that this closure plan will address closure of above-ground units (i.e., tanks and the top surface of concrete secondary containment systems). Although oil contamination resulting from past practices has been identified at the Pier 91 Facility, any contaminated soil, groundwater, and concrete structures will be addressed under a MTCA order cleanup.

I3.1 Regulatory Requirements

Revised PRMOD8-2

The closure cost estimates, as required by 40 CFR 264.142(a)(1) and WAC 620(3)(a)(i), must reflect an estimate of the cost of facility closure at a point when the extent and manner of its operations would make closure the most expensive. The total estimated cost for closure of the facility for the maximum waste inventory is $49,809 (1995 dollars). Table I3-1, Cost Estimates Reflecting Closure at Maximum Waste Inventory, provides a breakdown of this estimate. The costs are broken down further in Sections I3.3 through I3.5, and in Appendix I-2.

These costs are based on the current value of the dollar as of the most recent revision of this Closure Plan. Background cost data to support these estimates are provided in Appendix I-1, Unit Costs and Assumptions and Appendix I-2, Closure Cost Calculations for Maximum Waste Inventory.

During the operating life of the facility, Philip will adjust the closure cost estimates annually to take inflation into account. The adjustments will be made by recalculating closure costs in current dollars or by using an inflation factor as specified in 40 CFR 264.142(b)(i) and (b)(ii) and WAC 173-303-620(3)(c).

TABLE I3-1 COST ESTIMATES REFLECTING CLOSURE AT MAXIMUM WASTE INVENTORY

Revised PRMOD8-2

ITEM DESCRIPTION	COST (1995 $)
Inventory elimination (tanks)	$13,721
Tank & ancillary equipment decontamination	$1,288
Secondary containment structure decontamination (includes loading/unloading pad)	$10,448
Heavy equipment decontamination	$62
Rinsate treatment and disposal	$5,930
Concrete sampling/analysis	$14,800
Personal protective equipment	$1,400
Engineering Certification	$2,160
MAXIMUM WASTE INVENTORY CLOSURE COST ESTIMATE	**$49,809**

The inflation adjustment will be made within 60 days prior to the anniversary date of the establishment of the financial assurance mechanism. The closure cost estimates also will be revised if a change in the Closure Plan increases the cost of closing the facility. The cost revisions will be made within 90 days after agency approval of the change.

The financial assurance mechanism will be updated on an annual basis or as needed to reflect the current status of the facility in terms of the construction and closure of waste management units.

I3.2 Inventory Elimination Costs

Revised PRMOD8-2

The costs for treating, transporting, and off-site disposal of remaining inventory after wastes are no longer accepted at the facility are included in this section. Inventory elimination cost estimates are based on the maximum waste inventory, and are summarized in Table I3-2. Calculations and unit costs for inventory elimination are presented in Appendix I-2, Closure Cost Estimates.

TABLE I3-2 INVENTORY ELIMINATION COSTS

ITEM	QUANTITY	UNIT COST	TOTAL COST
Tank 164 (sludge)	14,810 gal.	$0.93/gal	$13,721
TOTAL INVENTORY ELIMINATION COST			**$13,721**

I3.3 Facility Decontamination Costs

Revised PRMOD8-2

The closure costs for decontamination of facility equipment and waste management units are included in this section. Specifically, cost estimates are included for decontamination of the following:

- Tank 164 and associated ancillary equipment
- secondary containment structures
- heavy equipment used during closure

Cost estimates for rinsate decontamination have also been included in this section.

Tanks, secondary containment structures, and heavy equipment will be decontaminated by triple-rinsing with a high-pressure washer. For cost estimating purposes, it is assumed that pumps and piping will be decontaminated with a detergent triple-rinse. Tanks and equipment will be salvaged to the extent possible. However, salvage value has not been incorporated into the closure cost estimate. Costs for facility decontamination are summarized in Table I3-3, Facility Decontamination Costs. Calculations for cost estimates are presented in Appendix I-2, Closure Cost Calculations for Maximum Waste Inventory.

TABLE I3-3. FACILITY DECONTAMINATION COSTS
Revised PRMOD8-2

ITEM	QUANTITY	UNIT COST	TOTAL COST
Tank 164 (including ancillary equipment)			
	14,810 gal.	\$0.087/gal	\$1,288
Secondary containment structures (Tanks 164 and 109-112 area)			
high pressure washing	4,597ft^2	\$1.09/ft^2	\$5,011
labor	115 man-hrs	\$30/man-hr	\$3,450
Secondary containment structures (load/unload area)			
high pressure washing	1,080ft^2	\$1.09/ft^2	\$1,177
labor	27 man-hrs	\$30/man-hr	\$ 810

Heavy equipment high-pressure washing:

Forklift	1	$62	$ 62
Rinsate disposal	26,232 gal	$0.226	$5,930
TOTAL FACILITY DECONTAMINATION COST			**$17,728**

I3.4 Sampling and Analytical Costs

Revised PRMOD8-2

Concrete chip samples from secondary containment areas will be taken from 16 biased and random sampling locations. Concrete chip samples will be collected after triple-rinsing for decontamination is complete. The samples will be analyzed for the same constituents as for the approved interim status closure plan (semi-volatiles, PCBs, total metals, BTEX, and TPH). Costs for sample collection and analysis are summarized in Table I3-4. Detailed cost estimates are included in Appendix I2, Closure Cost Calculations for Maximum Waste Inventory. Plans for sample collection and analysis are summarized below, and are described in detail in Section I1.5.3, Sampling and Analysis.

TABLE I3-4. SAMPLING AND ANALYTICAL COSTS
Revised PRMOD8-2

ITEM	QUANTITY	UNIT COST	TOTAL COST
sample collection	16 samples	$26/sample	$416
sample analysis (small yard, o/w separator, load/unload pad	16 samples	$889/sample for semi-volatiles, total metals, PCBs, BTEX, TPH	$14,384
TOTAL SAMPLING AND ANALYTICAL COST			**$14,800**

14.0 POST-CLOSURE COST ESTIMATE REQUIREMENTS

40 CFR 270.14(b)(16), 264.144, 264.197(c)(3)
WAC 173-303-806(4)(xvi), 620(5)
Revised PRMOD8-2

Philip has not operated dangerous waste disposal units at the Pier 91 Facility. The tank systems at the facility include adequate secondary containment, and thus will not be subject to the contingent post-closure care cost estimate requirements of 40 CFR 264.197(c)(3) and (5). No dangerous waste residues or contaminated materials will be left in place upon final closure of the facility. Therefore, a post-closure care cost estimate is not provided. Should ongoing corrective action measures not fully address soil and groundwater contamination, a post-closure permit could be required.

15.0 NOTICE IN DEED REQUIREMENTS AND SURVEY PLAT REQUIREMENTS

40 CFR 270.14(b)(14), 264.116, 264.117(c), 264.119
WAC 173-303-806(4)(a)(xiv), 610(7)(d), (8), (10), (11)

Philip has not operated dangerous waste disposal units at the Pier 91 Facility. The tank systems at the facility include adequate secondary containment, and thus will not be subject to the contingent post-closure care requirements of 40 CFR 264.197(c)(2) and (c)(5).

No regulated units containing dangerous wastes will remain at the site after closure; therefore, a notice in deed regarding restrictions on the use of land used to manage dangerous wastes will not be necessary. Similarly, the requirement for a survey plat indicating the location of landfill cells or other dangerous waste disposal units remaining on site will not be required.

I6.0 FINANCIAL ASSURANCE MECHANISM

40 CFR 270.14(b)(15) and (16), 264.143, 264.145, 264.197(c)(4) and (c)(5)
WAC 173-303-806(4)(a)(xv) and (xvi), 620(4) and (6)
Revised PRMOD8-2

Financial assurance for Pier 91 facility closure costs is covered by an insurance policy issued by American International Specialty Lines Insurance Company (Policy Number EPP 8182765). A copy of the insurance certificated is provided in Appendix I-3.

Philip has not operated dangerous waste disposal units at the Pier 91 Facility. The tank systems at the facility include adequate secondary containment, and will not be subject to the contingent post-closure care cost estimate requirements of 40 CFR 264.197(c)(4) and (5). No dangerous waste residues or contaminated materials will be left in place upon final closure of the facility; therefore, a post-closure care cost estimate is not provided.

I7.0 LIABILITY REQUIREMENTS

40 CFR 270.14(b)(17), 264.147
WAC 173-303-806(4)(a)(xvii), 620(8), (9)

Philip has provided demonstration of financial responsibility for bodily injury and property damage for sudden accidental occurrences arising from operations of its facilities. The policy is issued by American International Specialty Lines Insurance Company (Policy Number EPP 8182765). A copy of the company's certificate of liability insurance is included as Appendix I-4.

This demonstration of financial responsibility has been obtained under interim status requirements (40 CFR 265.147) and final status requirements (40 CFR 264.147 and WAC 173-303-620). The certificate of liability insurance has been issued by an insurer which is licensed to transact the business of insurance (or eligible to provide insurance as an excess or surplus lines insurer) in one or more states, as required by 40 CFR 264.147(a)(1)(ii).

No regulated units as defined in WAC 173-303-040(75) (e.g., surface impoundment, landfill, land treatment area, or waste pile) are used to manage dangerous wastes at the Pier 91 Facility. The tank systems at the facility include adequate secondary containment, and thus will not be subject to the contingent post-closure care requirements of 40 CFR 264.197(c)(2) and (c)(5). No dangerous waste residues or contaminated materials will be left in place upon final closure of the facility. Therefore, demonstration of financial responsibility for non-sudden accidental occurrences arising from operations of facilities is not provided.

In the event of bankruptcy of the trustee or institution issuing a trust fund, surety bond, letter of credit, or insurance policy, or a suspension or revocation of the authority of the trustee institution to act as trustee or of the institution issuing the surety bond, letter of credit, or insurance policy to issue such instruments, Philip will establish other financial assurance or liability coverage within 60 days after such an event.

Philip will notify Ecology by certified mail of the commencement of a voluntary or involuntary proceeding under Title 11 (Bankruptcy), United States Code, naming Philip as debtor, within 10 days after commencement of the proceedings.

Appendix I-1

Unit Costs and Assumptions

Revised PRMOD8-2

APPENDIX I-1

UNIT COSTS AND ASSUMPTIONS

The assumptions and procedures used to develop unit costs for final status closure cost estimates are as follows:

1. Cost estimates include all activities associated with closure of the dangerous waste management units and the general facility. Costs associated with treatment of dangerous waste inventories through the individual waste management units also are included as part of the cost estimate.

2. The processing of the dangerous wastes within the facility and individual waste management units will be performed using the same procedures as the facility would normally use to process the wastes.

3. Although costs reflect the use of third parties to close the interim status portion of the facility, it is intended that closure will be performed by trained Burlington technicians familiar with the various processing units.

4. Supplies and equipment will be salvaged to the extent possible. However, salvage value has not been incorporated into the closure cost estimate.

5. Burlington's on-site equipment will be used where possible. Outside contractor's equipment will be used as necessary.

6. Costs for decontaminating sampling equipment between samples is considered negligible.

7. Estimated man-hours needed to perform closure activities and unit cost estimates are based on Burlington's previous experience and best estimates, and on the EPA guidance document: Final Report Guidance Manual: Cost Estimates for Closure and Post-Closure Plans (Subparts G and H) Volume III - Unit Costs.

UNIT COSTS FOR CLOSURE ACTIVITIES

ITEM DESCRIPTION	1995 UNIT COST	SOURCE
Operator labor	\$30/hr.	Guidance Manual
Tank decontamination	\$0.087/gal of tank	Contractor estimate
High-pressure washing	\$1.09/ft^2	Guidance Manual
Equipment decontamination forklift	\$62/forklift	Guidance Manual
Concrete sample	\$26/sample	Facility operating experience
Professional Engineer	\$72/hr.	Guidance Manual

Appendix I-2

Closure Cost Calculations for Maximum Waste Inventory

Revised PRMOD8-2

APPENDIX I-2

CLOSURE COST CALCULATIONS FOR MAXIMUM WASTE INVENTORY
(The following cost estimates are summarized in Section I3.0)

A. Inventory Elimination Costs for Maximum Waste Inventory

Industrial Waste Sludge (to be sent to an off-site RCRA-permitted disposal facility)

Quantity: Tank 164 = 14,810 gallons

Pumpable sludge sent off-site for fuel blending and non-pumpable sludge sent off-site for stabilization and landfill.

Pumpable sludge = 95% x 14,810 gallons = 14,070 gallons

Loading sludge = (14070 gal)/(5,000 gal/hr) x $30/hr	= $84
Transport sludge = (14,070 gal x $300/5,000 gal load	= $900
Off-site disposal = 14,070 gal x $0.75/gal	= $10,553

Non-pumpable sludge = 5% x 14,810 gallons = 740 gallons

Loading sludge = (740 gal)/(55 gal drum/hr) x $30/hr	= $404
Transport sludge = 1 load (drums) x $300/load	= $300
Off-site disposal = 740 gal x $2/gal	= $1,480

TOTAL MAXIMUM WASTE INVENTORY ELIMINATION COST = ***$13,721***

B. Facility Decontamination Costs

1. Tank Decontamination

Unit Cost = $0.087/gallon (contractor estimate)

Tank 164 14,810 gal x $0.087 = **$1,288**

2. Secondary Containment Structure Decontamination

Unit costs (Guidance Manual) for high pressure washing = $1.09/ft.^{2} at 40 ft^2/hr.

Yard by Tanks 109-112, 164: surface area = 4,597 ft^2
(surface area = yard area - tank area = (77 ft x 93 ft) - (6 x 641 ft^2) = 4,597 ft^2)

- high pressure washing
  4,597 ft^2 x $1.09/ft^2 = $5,011

- labor
  (4,597 ft^2)/(40 ft.^{2}/hr.) x 1 man
  = 115 man-hr.
  115 man hr. x $30/hr. = $3,450

Loading/Unloading Pad: surface area = 1,080 ft^2
- high pressure washing
  1,080 ft^2 x \$1.09/ft^2 = \$1,177

- labor
  (1,080 ft^2)/(40 $ft.^2$/hr.) x 1 man
  = 27 man-hr.
  27 man-hr. x \$30/hr. = \$810

Total Secondary Containment Decontamination Cost = **\$10,448**

3. Decontamination of Equipment

Unit costs for decontaminating heavy equipment and for mobilization/demobilization obtained from the Guidance Manual. Equipment is decontaminated by steam cleaning. Residual generated at a rate of 100 gallons/hr. Assume this quantity to be negligible. Assume that facility-owned forklifts will be used.

Forklift decontamination cost = \$62/forklift x 1 forklift = **\$62**

4. Decontamination Rinsate Treatment and Disposal

The following describes the quantities of rinsate generated during decontamination. Assume 4 gallons of rinsate for each square foot of surface area.

Item	Surface Area	Rinsate Generated
Tank 164	881	3,524
Containment by Tanks 109-112, 164	4,597	18,388
Load/Unload Pad Containment	1,08023	4,320
Total Rinsate Requiring Treatment =		26,232 gallons

Rinsate will be transported off-site for wastewater treatment.

Loading wastewater = 26,232 gallons / 5,000 gal/hr x \$30/hr = \$158

Transport wastewater = 26,232 gallons x \$250/5,000 gal = \$1,312

Off-site treatment = 26,232 gallons x \$0.17/gal = \$4,460

TOTAL RINSATE TREATMENT AND DISPOSAL COST = **\$5,930**

TOTAL FACILITY DECONTAMINATION COST = *\$17,728*

C. Sampling and Analytical Costs

1. Collection Costs for Concrete Samples

Assume 16 samples will be collected from the concrete surface of containment pads and related sumps, at biased and random sampling locations. Unit cost for sample collection is $26/sample.

Concrete samples = 16 samples x $26/sample	=	**$416**

2. Analytical Cost for Concrete Samples

Each sample will be analyzed for the following parameters: semi-volatiles, total metals, PCBs, BTEX, and total petroleum hydrocarbons. The unit cost for each sample is $889.

Analytical cost = 16 samples x $889/sample	=	**$14,384**
TOTAL SAMPLING AND ANALYTICAL COST	=	***$14,800***

D. Miscellaneous Costs

1. Personal Protective Equipment

It is assumed that 10 workers will need personal protective equipment including total body coveralls, gloves, goggles, respirator (half-mask), and hard hat at a cost of $140 per worker.

10 workers x $140/worker	=	**$1,400**

2. Engineering Certification

Unit cost obtained from the Guidance Manual for professional engineer ($72/hr). Assume engineer visits the site once per week during closure period at six hours/visit. Estimated period is 6 weeks.

1 visit/wk. x 3 wk. x 6 hr./visit x $72/hr.	=	$1,296

Assume an additional eight hours for review of Closure Plan and four hours for preparation of final documentation.

(8 hr. + 4 hr.) x $72/hr.	=	$864
Total Engineering Costs	=	**$2,160**
TOTAL MISCELLANEOUS COST	=	***$3,560***

TOTAL CLOSURE COST = $49,809

Appendix I-3

Certificate of Insurance for Closure

Revised PRMOD8-2

CERTIFICATE OF INSURANCE FOR CLOSURE

Name and Address of Insurer (herein called the "Insurer"): American International Specialty Lines Insurance Company, Harborside Financial Center, 401 Plaza 3, Jersey City, NJ 07311.
Name and Address of Insured (herein called the "Insured"): Philip Environmental Inc., 515 Lycaste Avenue, Detroit, Michigan 48214

Facilities Covered:	Face Amount:
WAD 000 812 909 Philip Environmental Inc. - Georgetown Facility 734 Lucile Street, Seattle, WA 98108	U.S. $1,600,478.
WAD 991 281 767 Philip Environmental Inc. - Kent Plant 20245 - 77th Avenue South, Kent, WA 98032	U.S. $600,941.
WAD 000 812 917 Philip Environmental Inc. - Pier 91 2001 West Garfield St., Seattle, WA 98119	U.S. $681,730.
WAD 020 257 945 Philip Environmental Inc. - Tacoma Plant 1701 E. Alexander Ave., Tacoma, WA 98421	U.S. $811,546.
WAD 092 300 250 Philip Environmental Inc. - Washougal Facility 625 S. 32nd Street., Washougal, WA 98671	U.S. $1,063,142.

Policy Number: EPP 8182765
Effective Date: October 31, 1995

The Insurer hereby certifies that it has issued to the Insured the policy of insurance identified above to provide financial assurance for "closure" for the facilities identified above. The Insurer further warrants that such policy conform in all respects with the requirements of 40 CFR 264.143(e), 264.145(e), 265.143(d), and 265.145(d), and WAC 173-303-620, as applicable and as such regulations were constituted on the date shown immediately below. It is agreed that any provision of the policy inconsistent with such regulations is hereby amended to eliminate such inconsistency.

Whenever requested by the Washington Department of Ecology, the Insurer agrees to furnish to the Director a duplicate original of the policy listed above, including all endorsements thereon.

I hereby certify that the wording of this certificate is identical to the wording specified in 40 CFR 264.151(e) and WAC 173-303-620 (10) as such regulations were constituted on the date shown immediately below.

Armand G. Pepin — date
Treasurer

Jill Cummings
Signature of Witness

DUPLICATE
ORIGINAL

Appendix I-4

Certificate of Liability Insurance

Revised PRMOD8-2

STATE OF WASHINGTON
DANGEROUS WASTE FACILITY
CERTIFICATE OF LIABILITY INSURANCE

1. American International Specialty Lines Insurance Company (the "Insurer"), of Harborside Financial Center, 401 Plaza 3, Jersey City, New Jersey 07311, hereby certifies that it has issued liability insurance covering bodily injury and property damage to **Philip Environmental Inc.** (the "Insured"), of 515 Lycaste Avenue, Detroit, Michigan 48214 in connection with the Insured's obligation to demonstrate financial responsibility under 40 CFR 265.147 (for interim status) or WAC 173-303-620 (for final status). The coverage applies at:

EPA # WAD 000 812 909 **Georgetown Facility** **734 South Lucile Street** **Seattle, WA 98108**	**EPA # WAD 991 281 767** **Kent Plant** **20245 77th Avenue South** **Kent, WA 98032**	**EPA # WAD 000 812 917** **Pier 91** **2001 West Garfield St.** **Seattle, WA 98119**
EPA # WAD 020 257 945 **Tacoma Plant** **1701 East Alexander Ave.** **Tacoma, WA 98421**	**EPA # WAD 092 300 250** **Washougal Facility** **625 S. 32nd Street** **Washougal, WA 98671**	

for "sudden accidental occurrences." The limits of liability are U.S. **$2,000,000** each occurrence and U.S. **$2,000,000** annual aggregate, exclusive of legal defense costs for each location referenced above. The coverage is provided under policy number **EPP 8182765** issued on **October 31, 1995**. The effective dates of said policy are **October 31, 1995, to October 31, 1996.**

2. The Insurer further certifies the following with respect to the insurance described in Paragraph 1:
(a) Bankruptcy or insolvency of the Insured shall not relieve the Insurer of its obligations under the policy.
(b) The Insurer is liable for the payments of amounts within any deductible applicable to the policy, with a right of reimbursement by the Insured for any such payment made by the Insurer. This provision does not apply with respect to that amount of the deductible for which coverage is specified in 40 CFR 265.147 (for interim status), WAC 173-303-620 (for final status).
(c) Whenever requested by the Washington State Department of Ecology (WDOE), the Insurer agrees to furnish WDOE a signed duplicate original of the policy and all endorsements.
(d) Cancellation of the insurance whether by the Insurer, the Insured, a parent corporation providing insurance coverage for its subsidiary, or by a firm having an insurable interest in and obtaining liability insurance on behalf of the owner or operator of the hazardous waste management facility, will only be effective upon written notice and only after expiration of sixty (60) days after a copy of such written notice is received by WDOE.
(e) Any other termination of the insurance will be effective only upon written notice and only after the expiration of thirty (30) days after a copy of such written notice is received by WDOE.

I hereby certify that the wording of this instrument is, with the exception of changes required by the Washington State Department of Ecology to assure compliance with the financial requirements of WAC 173-303-400 and/or WAC 173-303-620 (10), identical to the wording specified in 40 CFR 264.151 (j) as such regulation was constituted on the date first above written, and that the Insurer is licensed to transact the business of insurance, or eligible to provide insurance as an excess or surplus lines insurer, in one or more States.

Armand G. Pepin, Treasurer
American International Specialty Lines Insurance Company

DUPLICATE
ORIGINAL

Appendix I-5

Analytical Test Methods and Detection Limits

Revised PRMOD8-2

List of Analytes for the Closure Plan

Analyte	SW-846 Method	Estimated Instrumental Detection Limit of Liquid after Distillation, Digestion or Extraction (ug/l)
Arsenic (As)	6010	53
Barium (Ba)	6010	2
Cadmium (Cd)	6010	4
Chromium (Cr)	6010	7
Lead (Pb)	6010	42
Mercury (Hg)	7470	0.2
Selenium (Se)	7740	2
Silver (Ag)	6010	7
PCBs	8080	(see Method)
TPH	418.1 (not SW-846)	(see Method)
BTEX (see attached method list of analytes)	8260	(see Method)
Semi-Volatiles (see attached method list of analytes)	8270	(see Method)

METHOD #: 6010A (SW-846 Update I, July 1992)

TITLE: Inductively Coupled Plasma-Atomic Emission Spectroscopy

1.0 SCOPE AND APPLICATION

1.1 Inductively coupled plasma-atomic emission spectroscopy (ICP) determines trace elements, including metals, in solution. The method is applicable to all of the elements listed in Table 1. All matrices, including ground water, aqueous samples, TCLP and EP extracts, industrial and organic wastes, soils, sludges, sediments, and other solid wastes, require digestion prior to analysis.

1.2 Elements for which Method 6010 is applicable are listed in Table 1. Detection limits, sensitivity, and optimum ranges of the metals will vary with the matrices and model of spectrometer. The data shown in Table 1 provide estimated detection limits for clean aqueous samples using pneumatic nebulization. Use of this method is restricted to spectroscopists who are knowledgeable in the correction of spectral, chemical, and physical interferences.

ANALYTE:	CAS #
Aluminum Al	7440-36-0
Antimony Sb	7440-36-0
Arsenic As	7440-38-2
Barium Ba	7440-39-3
Beryllium Be	7440-41-7
Cadmium Cd	7440-43-9
Calcium Ca	7440-70-2
Chromium Cr	7440-43-9
Cobalt Co	7440-48-4
Copper Cu	7440-50-8
Iron Fe	7439-89-6
Lead Pb	7439-92-1
Lithium Li	7439-93-2
Magnesium Mg	7439-95-4
Manganese Mn	7439-96-5
Molybdenum Mo	7439-98-7
Nickel Ni	7440-02-0
Phosphorous P	7723-14-0
Potassium K	7440-09-7

Selenium Se	7782-49-2
Silver Ag	7440-22-4
Sodium Na	7440-23-5
Strontium Sr	7440-24-6
Thallium Tl	7440-28-0
Vanadium V	7440-62-2
Zinc Zn	7440-66-6

INSTRUMENTATION: ICP

2.0 SUMMARY OF METHOD

2.1 Prior to analysis, samples must be solubilized or digested using appropriate Sample Preparation Methods (e.g. Methods 3005-3050). When analyzing for dissolved constituents, acid digestion is not necessary if the samples are filtered and acid preserved prior to analysis.

2.2 Method 6010 describes the simultaneous, or sequential, multielemental determination of elements by ICP. The method measures element-emitted light by optical spectrometry. Samples are nebulized and the resulting aerosol is transported to the plasma torch. Element-specific atomic-line emission spectra are produced by a radio-frequency inductively coupled plasma. The spectra are dispersed by a grating spectrometer, and the intensities of the lines are monitored by photomultiplier tubes. Background correction is required for trace element determination. Background must be measured adjacent to analyte lines on samples during analysis. The position selected for the background-intensity measurement, on either or both sides of the analytical line, will be determined by the complexity of the spectrum adjacent to the analyte line. The position used must be free of spectral interference and reflect the same change in background intensity as occurs at the analyte wavelength measured. Background correction is not required in cases of line broadening where a background correction measurement would actually degrade the analytical result. The possibility of additional interferences named in Section 3.0 should also be recognized and appropriate corrections made; tests for their presence are described in Step 8.5.

TABLE 1. RECOMMENDED WAVELENGTHS AND ESTIMATED INSTRUMENTAL DETECTION LIMITS

Detection	Wavelength(a) (nm)	Estimated Element Limit(b) (ug/L)
Aluminum	308.215	45
Antimony	206.833	32
Arsenic	193.696	53
Barium	455.403	2
Beryllium	313.042	0.3
Cadmium	226.502	4
Calcium	317.933	10
Chromium	267.716	7
Cobalt	228.616	7

Copper	324.754	6
Iron	259.940	7
Lead	220.353	42
Lithium	670.784	5
Magnesium	279.079	30
Manganese	257.610	2
Molybdenum	202.030	8
Nickel	231.604	15
Phosphorus	213.618	51
Potassium	766.491	See note c
Selenium	196.026	75
Silver	328.068	7
Sodium	588.995	29
Strontium	407.771	0.3
Thallium	190.864	40
Vanadium	292.402	8
Zinc	213.856	2

(a) The wavelengths listed are recommended because of their sensitivity and overall acceptance. Other wavelengths may be substituted if they can provide the needed sensitivity and are treated with the same corrective techniques for spectral interference (see Step 3.1). In time, other elements may be added as more information becomes available and as required.

(b) The estimated instrumental detection limits shown are taken from Reference 1 in Section 10.0 below. They are given as a guide for an instrumental limit. The actual method detection limits are sample dependent and may vary as the sample matrix varies.

(c) Highly dependent on operating conditions and plasma position.

3.0 INTERFERENCES

3.1 Spectral interferences are caused by: (1) overlap of a spectral line from another element at the analytical or background measurement wavelengths; (2) unresolved overlap of molecular band spectra; (3) background contribution from continuum or recombination phenomena; and (4) stray light from the line emission of high-concentration elements. Spectral overlap can be compensated for by computer-correcting the raw data after monitoring and measuring the interfering element. Unresolved overlap requires selection of an alternative wavelength. Background contribution and stray light can usually be compensated for by a correction adjacent to the analyte line.

Users of all ICP instruments must verify the absence of spectral interference from an element in a sample for which there is no instrument detection channel. Recommended wavelengths are listed in Table 1 and potential spectral interferences for the recommended wavelengths are given in Table 2. The data in Table 2 are intended as rudimentary guides for indicating potential interferences; for this purpose, linear relations between concentration and intensity for the analytes and the interferents can be assumed.

3.1.1 Element-specific interference is expressed as analyte concentration equivalents (i.e. false analyte concentrations) arising from 100 mg/L of the interference element. For example, assume that As is to be determined (at 193.696 nm) in a sample containing approximately 10 mg/L of Al. According to Table 2, 100 mg/L of Al would yield a false signal for As equivalent to approximately 1.3 mg/L. Therefore, the presence of 10 mg/L of Al

METHOD 7470A

MERCURY IN LIQUID WASTE (MANUAL COLD-VAPOR TECHNIQUE)

1.0 SCOPE AND APPLICATION

1.1 Method 7470A is a cold-vapor atomic absorption procedure approved for determining the concentration of mercury in mobility-procedure extracts, aqueous wastes, and ground waters. (Method 7470A can also be used for analyzing certain solid and sludge-type wastes; however, Method 7471A is usually the method of choice for these waste types.) All samples must be subjected to an appropriate dissolution step prior to analysis.

2.0 SUMMARY OF METHOD

2.1 Prior to analysis, the liquid samples must be prepared according to the procedure discussed in this method.

2.2 Method 7470A, a cold-vapor atomic absorption technique, is based on the absorption of radiation at 253.7-nm by mercury vapor. The mercury is reduced to the elemental state and aerated from solution in a closed system. The mercury vapor passes through a cell positioned in the light path of an atomic absorption spectrophotometer. Absorbance (peak height) is measured as a function of mercury concentration.

2.3 The typical detection limit for this method is 0.0002 mg/L.

3.0 INTERFERENCES

3.1 Potassium permanganate is added to eliminate possible interference from sulfide. Concentrations as high as 20 mg/L of sulfide as sodium sulfide do not interfere with the recovery of added inorganic mercury from reagent water.

3.2 Copper has also been reported to interfere; however, copper concentrations as high as 10 mg/L had no effect on recovery of mercury from spiked samples.

3.3 Seawaters, brines, and industrial effluents high in chlorides require additional permanganate (as much as 25 mL) because, during the oxidation step, chlorides are converted to free chlorine, which also absorbs radiation of 253.7 nm. Care must therefore be taken to ensure that free chlorine is absent before the mercury is reduced and swept into the cell. This may be accomplished by using an excess of hydroxylamine sulfate reagent (25 mL). In addition, the dead air space in the BOD bottle must be purged before adding stannous sulfate. Both inorganic and organic mercury spikes have been quantitatively recovered from seawater by using this technique.

3.4 Certain volatile organic materials that absorb at this wavelength may also cause interference. A preliminary run without reagents should determine if this type of interference is present.

METHOD 7740

SELENIUM (ATOMIC ABSORPTION, FURNACE TECHNIQUE)

1.0 SCOPE AND APPLICATION

1.1 Method 7740 is an atomic absorption procedure approved for determining the concentration of selenium in wastes, mobility-procedure extracts, soils, and ground water. All samples must be subjected to an appropriate dissolution step prior to analysis.

2.0 SUMMARY OF METHOD

2.1 Prior to analysis by Method 7740, samples must be prepared in order to convert organic forms of selenium to inorganic forms, to minimize organic interferences, and to convert samples to suitable solutions for analysis. The sample-preparation procedure varies, depending on the sample matrix. Aqueous samples are subjected to the acid-digestion procedure described in this method. Sludge samples are prepared using the procedure described in Method 3050.

2.2 Following the appropriate dissolution of the sample, a representative aliquot is placed manually or by means of an automatic sampler into a graphite tube furnace. The sample aliquot is then slowly evaporated to dryness, charred (ashed), and atomized. The absorption of lamp radiation during atomization will be proportional to the selenium concentration.

2.3 The typical detection limit for this method is 2 ug/L.

3.0 INTERFERENCES

3.1 Elemental selenium and many of its compounds are volatile; therefore, samples may be subject to losses of selenium during sample preparation. Spike samples and relevant standard reference materials should be processed to determine if the chosen dissolution method is appropriate.

3.2 Likewise, caution must be employed during the selection of temperature and times for the dry and char (ash) cycles. A nickel nitrate solution must be added to all digestates prior to analysis to minimize volatilization losses during drying and ashing.

3.3 In addition to the normal interferences experienced during graphite furnace analysis, selenium analysis can suffer from severe nonspecific absorption and light scattering caused by matrix components during atomization. Selenium analysis is particularly susceptible to these problems because of its low analytical wavelength (196.0 nm). Simultaneous background correction is required to avoid erroneously high results. High iron levels can give overcorrection with deuterium background. Zeeman background correction can be useful in this situation.

METHOD 8080A

ORGANOCHLORINE PESTICIDES AND POLYCHLORINATED BIPHENYLS BY GAS CHROMATOGRAPHY

1.0 SCOPE AND APPLICATION

1.1 Method 8080 is used to determine the concentration of various organochlorine pesticides and polychlorinated biphenyls (PCBs). The following compounds can be determined by this method:

Compound Name	CAS No.[a]
Aldrin	309-00-2
α-BHC	319-84-6
β-BHC	319-85-7
δ-BHC	319-86-8
γ-BHC (Lindane)	58-89-9
Chlordane (technical)	12789-03-6
4,4'-DDD	72-54-8
4,4'-DDE	72-55-9
4,4'-DDT	50-29-3
Dieldrin	60-57-1
Endosulfan I	959-98-8
Endosulfan II	33212-65-9
Endosulfan sulfate	1031-07-8
Endrin	72-20-8
Endrin aldehyde	7421-93-4
Heptachlor	76-44-8
Heptachlor epoxide	1024-57-3
4,4'-Methoxychlor	72-43-5
Toxaphene	8001-35-2
Aroclor-1016	12674-11-2
Aroclor-1221	1104-28-2
Aroclor-1232	11141-16-5
Aroclor-1242	53469-21-9
Aroclor-1248	12672-29-6
Aroclor-1254	11097-69-1
Aroclor-1260	11096-82-5

a Chemical Abstract Services Registry Number.

1.1 Table 1 lists the method detection limit for each compound in organic-free reagent water. Table 2 lists the estimated quantitation limit (EQL) for other matrices.

TABLE 1.
GAS CHROMATOGRAPHY OF PESTICIDES AND PCBs[a]

Analyte	Retention time (min) Col. 1	Col. 2	Method Detection limit (μg/L)
Aldrin	2.40	4.10	0.004
α-BHC	1.35	1.82	0.003
β-BHC	1.90	1.97	0.006
δ-BHC	2.15	2.20	0.009
γ-BHC (Lindane)	1.70	2.13	0.004
Chlordane (technical)	e	e	0.014
4,4'-DDD	7.83	9.08	0.011
4,4'-DDE	5.13	7.15	0.004
4,4'-DDT	9.40	11.75	0.012
Dieldrin	5.45	7.23	0.002
Endosulfan I	4.50	6.20	0.014
Endosulfan II	8.00	8.28	0.004
Endosulfan sulfate	14.22	10.70	0.066
Endrin	6.55	8.10	0.006
Endrin aldehyde	11.82	9.30	0.023
Heptachlor	2.00	3.35	0.003
Heptachlor epoxide	3.50	5.00	0.083
Methoxychlor	18.20	26.60	0.176
Toxaphene	e	e	0.24
PCB-1016	e	e	nd
PCB-1221	e	e	nd
PCB-1232	e	e	nd
PCB-1242	e	e	0.065
PCB-1248	e	e	nd
PCB-1254	e	e	nd
PCB-1260	e	e	nd

[a]U.S. EPA. Method 617. Organochlorine Pesticides and PCBs. Environmental Monitoring and Support Laboratory, Cincinnati, Ohio 45268.

e = Multiple peak response.

nd = not determined.

TABLE 2.
DETERMINATION OF ESTIMATED QUANTITATION LIMITS (EQLs) FOR VARIOUS MATRICES[a]

Matrix	Factor[b]
Ground water	10
Low-concentration soil by sonication with GPC cleanup	670
High-concentration soil and sludges by sonication	10,000
Non-water miscible waste	100,000

a Sample EQLs are highly matrix-dependent. The EQLs listed herein are provided for guidance and may not always be achievable.

b EQL = [Method detection limit (Table 1)] X [Factor (Table 2)]. For non-aqueous samples, the factor is on a wet-weight basis.

METHOD 8260B

VOLATILE ORGANIC COMPOUNDS BY GAS CHROMATOGRAPHY/ MASS SPECTROMETRY (GC/MS): CAPILLARY COLUMN TECHNIQUE

1.0 SCOPE AND APPLICATION

1.1 Method 8260 is used to determine volatile organic compounds in a variety of solid waste matrices. This method is applicable to nearly all types of samples, regardless of water content, including various air sampling trapping media, ground and surface water, aqueous sludges, caustic liquors, acid liquors, waste solvents, oily wastes, mousses, tars, fibrous wastes, polymeric emulsions, filter cakes, spent carbons, spent catalysts, soils, and sediments. The following compounds can be determined by this method:

		Appropriate Technique[a]					
Compound	CAS No.[b]	5030/ 5035	5031	5032	5021	5041	Direct Inject.
Acetone	67-64-1	pp	c	c	nd	c	c
Acetonitrile	75-05-8	pp	c	nd	nd	nd	c
Acrolein (Propenal)	107-02-8	pp	c	c	nd	nd	c
Acrylonitrile	107-13-1	pp	c	c	nd	c	c
Allyl alcohol	107-18-6	ht	c	nd	nd	nd	c
Allyl chloride	107-05-1	c	nd	nd	nd	nd	c
Benzene	71-43-2	c	nd	c	c	c	c
Benzyl chloride	100-44-7	c	nd	nd	nd	nd	c
Bromoacetone	598-31-2	pp	nd	nd	nd	nd	c
Bromochloromethane	74-97-5	c	nd	c	c	c	c
Bromodichloromethane	75-27-4	c	nd	c	c	c	c
4-Bromofluorobenzene (surr)		c	nd	c	c	c	c
Bromoform	75-25-2	c	nd	c	c	c	c
Bromomethane	74-83-9	c	nd	c	c	c	c
n-Butanol	71-36-3	ht	c	nd	nd	nd	c
2-Butanone (MEK)	78-93-3	pp	c	c	nd	nd	c
t-Butyl alcohol	75-65-0	pp	c	nd	nd	nd	c
Carbon disulfide	75-15-0	pp	nd	c	nd	c	c
Carbon tetrachloride	56-23-5	c	nd	c	c	c	c
Chloral hydrate	302-17-0	pp	nd	nd	nd	nd	c
Chlorobenzene	108-90-7	c	nd	c	c	c	c
Chlorobenzene-d_5 (IS)		c	nd	c	c	c	c
Chlorodibromomethane	124-48-1	c	nd	c	nd	c	c
Chloroethane	75-00-3	c	nd	c	c	c	c
2-Chloroethanol	107-07-3	pp	nd	nd	nd	nd	c
Bis-(2-chloroethyl)sulfide	505-60-2	pp	nd	nd	nd	nd	c
2-Chloroethyl vinyl ether	110-75-8	c	nd	c	nd	nd	c
Chloroform	67-66-3	c	nd	c	c	c	c
Chloromethane	74-87-3	c	nd	c	c	c	c
Chloroprene	126-99-8	c	nd	nd	nd	nd	c
3-Chloropropionitrile	542-76-7	i	nd	nd	nd	nd	pc

TABLE 2

CHROMATOGRAPHIC RETENTION TIMES AND METHOD DETECTION LIMITS (MDL) FOR VOLATILE ORGANIC COMPOUNDS ON NARROW-BORE CAPILLARY COLUMNS

Compound	Retention Time (minutes) Column 3[a]	MDL[b] (μg/L)
Dichlorodifluoromethane	0.88	0.11
Chloromethane	0.97	0.05
Vinyl chloride	1.04	0.04
Bromomethane	1.29	0.06
Chloroethane	1.45	0.02
Trichlorofluoromethane	1.77	0.07
1,1-Dichloroethene	2.33	0.05
Methylene chloride	2.66	0.09
trans-1,2-Dichloroethene	3.54	0.03
1,1-Dichloroethane	4.03	0.03
cis-1,2-Dichloroethene	5.07	0.06
2,2-Dichloropropane	5.31	0.08
Chloroform	5.55	0.04
Bromochloromethane	5.63	0.09
1,1,1-Trichloroethane	6.76	0.04
1,2-Dichloroethane	7.00	0.02
1,1-Dichloropropene	7.16	0.12
Carbon tetrachloride	7.41	0.02
Benzene	7.41	0.03
1,2-Dichloropropane	8.94	0.02
Trichloroethene	9.02	0.02
Dibromomethane	9.09	0.01
Bromodichloromethane	9.34	0.03
Toluene	11.51	0.08
1,1,2-Trichloroethane	11.99	0.08
1,3-Dichloropropane	12.48	0.08
Dibromochloromethane	12.80	0.07
Tetrachloroethene	13.20	0.05
1,2-Dibromoethane	13.60	0.10
Chlorobenzene	14.33	0.03
1,1,1,2-Tetrachloroethane	14.73	0.07
Ethylbenzene	14.73	0.03
p-Xylene	15.30	0.06
m-Xylene	15.30	0.03
Bromoform	15.70	0.20
o-Xylene	15.78	0.06
Styrene	15.78	0.27
1,1,2,2-Tetrachloroethane	15.78	0.20
1,2,3-Trichloropropane	16.26	0.09
Isopropylbenzene	16.42	0.10

TABLE 2
(Continued)

Compound	Retention Time (minutes) Column 3[a]	MDL[b] (μg/L)
Bromobenzene	16.42	0.11
2-Chlorotoluene	16.74	0.08
n-Propylbenzene	16.82	0.10
4-Chlorotoluene	16.82	0.06
1,3,5-Trimethylbenzene	16.99	0.06
tert-Butylbenzene	17.31	0.33
1,2,4-Trimethylbenzene	17.31	0.09
sec-Butylbenzene	17.47	0.12
1,3-Dichlorobenzene	17.47	0.05
p-Isopropyltoluene	17.63	0.26
1,4-Dichlorobenzene	17.63	0.04
1,2-Dichlorobenzene	17.79	0.05
n-Butylbenzene	17.95	0.10
1,2-Dibromo-3-chloropropane	18.03	0.50
1,2,4-Trichlorobenzene	18.84	0.20
Naphthalene	19.07	0.10
Hexachlorobutadiene	19.24	0.10
1,2,3-Trichlorobenzene	19.24	0.14

[a] Column 3 - 30 meter x 0.32 mm ID DB-5 capillary with 1 μm film thickness.

[b] MDL based on a 25-mL sample volume.

METHOD 8270C

SEMIVOLATILE ORGANIC COMPOUNDS BY GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS): CAPILLARY COLUMN TECHNIQUE

1.0 SCOPE AND APPLICATION

1.1 Method 8270 is used to determine the concentration of semivolatile organic compounds in extracts prepared from many types of solid waste matrices, soils, air sampling media and water samples. Direct injection of a sample may be used in limited applications. The following compounds can be determined by this method:

		Appropriate Preparation Techniques[b]				
Compounds	CAS No[a]	3510	3520	3540/ 3541	3550	3580
Acenaphthene	83-32-9	X	X	X	X	X
Acenaphthene-d_{10} (IS)		X	X	X	X	X
Acenaphthylene	208-96-8	X	X	X	X	X
Acetophenone	98-86-2	X	ND	ND	ND	X
2-Acetylaminofluorene	53-96-3	X	ND	ND	ND	X
1-Acetyl-2-thiourea	591-08-2	LR	ND	ND	ND	LR
Aldrin	309-00-2	X	X	X	X	X
2-Aminoanthraquinone	117-79-3	X	ND	ND	ND	X
Aminoazobenzene	60-09-3	X	ND	ND	ND	X
4-Aminobiphenyl	92-67-1	X	ND	ND	ND	X
3-Amino-9-ethylcarbazole	132-32-1	X	X	ND	ND	ND
Anilazine	101-05-3	X	ND	ND	ND	X
Aniline	62-53-3	X	X	ND	X	X
o-Anisidine	90-04-0	X	ND	ND	ND	X
Anthracene	120-12-7	X	X	X	X	X
Aramite	140-57-8	HS(43)	ND	ND	ND	X
Aroclor 1016	12674-11-2	X	X	X	X	X
Aroclor 1221	11104-28-2	X	X	X	X	X
Aroclor 1232	11141-16-5	X	X	X	X	X
Aroclor 1242	53469-21-9	X	X	X	X	X
Aroclor 1248	12672-29-6	X	X	X	X	X
Aroclor 1254	11097-69-1	X	X	X	X	X
Aroclor 1260	11096-82-5	X	X	X	X	X
Azinphos-methyl	86-50-0	HS(62)	ND	ND	ND	X
Barban	101-27-9	LR	ND	ND	ND	LR
Benzidine	92-87-5	CP	CP	CP	CP	CP
Benzoic acid	65-85-0	X	X	ND	X	X
Benz(a)anthracene	56-55-3	X	X	X	X	X
Benzo(b)fluoranthene	205-99-2	X	X	X	X	X
Benzo(k)fluoranthene	207-08-9	X	X	X	X	X
Benzo(g,h,i)perylene	191-24-2	X	X	X	X	X
Benzo(a)pyrene	50-32-8	X	X	X	X	X

TABLE 2

ESTIMATED QUANTITATION LIMITS (EQLs) FOR SEMIVOLATILE ORGANICS

Compound	Estimated Quantitation Limits[a] Ground water µg/L	Low Soil/Sediment[b] µg/kg
Acenaphthene	10	660
Acenaphthylene	10	660
Acetophenone	10	ND
2-Acetylaminofluorene	20	ND
1-Acetyl-2-thiourea	1000	ND
2-Aminoanthraquinone	20	ND
Aminoazobenzene	10	ND
4-Aminobiphenyl	20	ND
Anilazine	100	ND
o-Anisidine	10	ND
Anthracene	10	660
Aramite	20	ND
Azinphos-methyl	100	ND
Barban	200	ND
Benz(a)anthracene	10	660
Benzo(b)fluoranthene	10	660
Benzo(k)fluoranthene	10	660
Benzoic acid	50	3300
Benzo(g,h,i)perylene	10	660
Benzo(a)pyrene	10	660
p-Benzoquinone	10	ND
Benzyl alcohol	20	1300
Bis(2-chloroethoxy)methane	10	660
Bis(2-chloroethyl) ether	10	660
Bis(2-chloroisopropyl) ether	10	660
4-bromophenyl phenyl ether	10	660
Bromoxynil	10	ND
Butyl benzyl phthalate	10	660
Captafol	20	ND
Captan	50	ND
Carbaryl	10	ND
Carbofuran	10	ND
Carbophenothion	10	ND
Chlorfenvinphos	20	ND
4-Chloroaniline	20	1300
Chlorobenzilate	10	ND
5-Chloro-2-methylaniline	10	ND
4-Chloro-3-methylphenol	20	1300
3-(Chloromethyl)pyridine hydrochloride	100	ND
2-Chloronaphthalene	10	660
2-Chlorophenol	10	660
4-Chlorophenyl phenyl ether	10	660

TABLE 2
(continued)

Compound	Estimated Quantitation Limits[a] Ground water µg/L	Low Soil/Sediment[b] µg/kg
Chrysene	10	660
Coumaphos	40	ND
p-Cresidine	10	ND
Crotoxyphos	20	ND
2-Cyclohexyl-4,6-dinitrophenol	100	ND
Demeton-O	10	ND
Demeton-S	10	ND
Diallate (cis or trans)	10	ND
Diallate (trans or cis)	10	ND
2,4-Diaminotoluene	20	ND
Dibenz(a,j)acridine	10	ND
Dibenz(a,h)anthracene	10	660
Dibenzofuran	10	660
Dibenzo(a,e)pyrene	10	ND
Di-n-butyl phthalate	10	ND
Dichlone	NA	ND
1,2-Dichlorobenzene	10	660
1,3-Dichlorobenzene	10	660
1,4-Dichlorobenzene	10	660
3,3'-Dichlorobenzidine	20	1300
2,4-Dichlorophenol	10	660
2,6-Dichlorophenol	10	ND
Dichlorovos	10	ND
Dicrotophos	10	ND
Diethyl phthalate	10	660
Diethylstilbestrol	20	ND
Diethyl sulfate	100	ND
Dimethoate	20	ND
3,3'-Dimethoxybenzidine	100	ND
Dimethylaminoazobenzene	10	ND
7,12-Dimethylbenz(a)anthracene	10	ND
3,3'-Dimethylbenzidine	10	ND
a,a-Dimethylphenethylamine	ND	ND
2,4-Dimethylphenol	10	660
Dimethyl phthalate	10	660
1,2-Dinitrobenzene	40	ND
1,3-Dinitrobenzene	20	ND
1,4-Dinitrobenzene	40	ND
4,6-Dinitro-2-methylphenol	50	3300
2,4-Dinitrophenol	50	3300
2,4-Dinitrotoluene	10	660
2,6-Dinitrotoluene	10	660
Dinocap	100	ND
Dinoseb	20	ND

TABLE 2
(continued)

Compound	Estimated Quantitation Limits[a] Ground water µg/L	Low Soil/Sediment[b] µg/kg
5,5-Diphenylhydantoin	20	ND
Di-n-octyl phthalate	10	660
Disulfoton	10	ND
EPN	10	ND
Ethion	10	ND
Ethyl carbamate	50	ND
Bis(2-ethylhexyl) phthalate	10	660
Ethyl methanesulfonate	20	ND
Famphur	20	ND
Fensulfothion	40	ND
Fenthion	10	ND
Fluchloralin	20	ND
Fluoranthene	10	660
Fluorene	10	660
Hexachlorobenzene	10	660
Hexachlorobutadiene	10	660
Hexachlorocyclopentadiene	10	660
Hexachloroethane	10	660
Hexachlorophene	50	ND
Hexachloropropene	10	ND
Hexamethylphosphoramide	20	ND
Hydroquinone	ND	ND
Indeno(1,2,3-cd)pyrene	10	660
Isodrin	20	ND
Isophorone	10	660
Isosafrole	10	ND
Kepone	20	ND
Leptophos	10	ND
Malathion	50	ND
Maleic anhydride	NA	ND
Mestranol	20	ND
Methapyrilene	100	ND
Methoxychlor	10	ND
3-Methylcholanthrene	10	ND
4,4'-Methylenebis(2-chloroaniline)	NA	ND
Methyl methanesulfonate	10	ND
2-Methylnaphthalene	10	660
Methyl parathion	10	ND
2-Methylphenol	10	660
3-Methylphenol	10	ND
4-Methylphenol	10	660
Mevinphos	10	ND
Mexacarbate	20	ND
Mirex	10	ND

TABLE 2
(continued)

Compound	Estimated Quantitation Limits[a] Ground water µg/L	Low Soil/Sediment[b] µg/kg
Monocrotophos	40	ND
Naled	20	ND
Naphthalene	10	660
1,4-Naphthoquinone	10	ND
1-Naphthylamine	10	ND
2-Naphthylamine	10	ND
Nicotine	20	ND
5-Nitroacenaphthene	10	ND
2-Nitroaniline	50	3300
3-Nitroaniline	50	3300
4-Nitroaniline	20	ND
5-Nitro-o-anisidine	10	ND
Nitrobenzene	10	660
4-Nitrobiphenyl	10	ND
Nitrofen	20	ND
2-Nitrophenol	10	660
4-Nitrophenol	50	3300
5-Nitro-o-toluidine	10	ND
4-Nitroquinoline-1-oxide	40	ND
N-Nitrosodi-n-butylamine	10	ND
N-Nitrosodiethylamine	20	ND
N-Nitrosodiphenylamine	10	660
N-Nitroso-di-n-propylamine	10	660
N-Nitrosopiperidine	20	ND
N-Nitrosopyrrolidine	40	ND
Octamethyl pyrophosphoramide	200	ND
4,4'-Oxydianiline	20	ND
Parathion	10	ND
Pentachlorobenzene	10	ND
Pentachloronitrobenzene	20	ND
Pentachlorophenol	50	3300
Phenacetin	20	ND
Phenanthrene	10	660
Phenobarbital	10	ND
Phenol	10	660
1,4-Phenylenediamine	10	ND
Phorate	10	ND
Phosalone	100	ND
Phosmet	40	ND
Phosphamidon	100	ND
Phthalic anhydride	100	ND
2-Picoline	ND	ND
Piperonyl sulfoxide	100	ND
Pronamide	10	ND

TABLE 2
(continued)

Compound	Estimated Quantitation Limits[a] Ground water µg/L	Low Soil/Sediment[b] µg/kg
Propylthiouracil	100	ND
Pyrene	10	660
Pyridine	ND	ND
Resorcinol	100	ND
Safrole	10	ND
Strychnine	40	ND
Sulfallate	10	ND
Terbufos	20	ND
1,2,4,5-Tetrachlorobenzene	10	ND
2,3,4,6-Tetrachlorophenol	10	ND
Tetrachlorvinphos	20	ND
Tetraethyl pyrophosphate	40	ND
Thionazine	20	ND
Thiophenol (Benzenethiol)	20	ND
Toluene diisocyanate	100	ND
o-Toluidine	10	ND
1,2,4-Trichlorobenzene	10	660
2,4,5-Trichlorophenol	10	660
2,4,6-Trichlorophenol	10	660
Trifluralin	10	ND
2,4,5-Trimethylaniline	10	ND
Trimethyl phosphate	10	ND
1,3,5-Trinitrobenzene	10	ND
Tris(2,3-dibromopropyl) phosphate	200	ND
Tri-p-tolyl phosphate(h)	10	ND
O,O,O-Triethyl phosphorothioate	NT	ND

a Sample EQLs are highly matrix-dependent. The EQLs listed here are provided for guidance and may not always be achievable.

b EQLs listed for soil/sediment are based on wet weight. Normally, data are reported on a dry weight basis, therefore, EQLs will be higher based on the % dry weight of each sample. These EQLs are based on a 30-g sample and gel permeation chromatography cleanup.

ND = Not Determined
NA = Not Applicable
NT = Not Tested

Other Matrices	Factor[c]
High-concentration soil and sludges by sonicator	7.5
Non-water miscible waste	75

[c]EQL = (EQL for Low Soil/Sediment given above in Table 2) x (Factor)

WTPH-418.1 MODIFIED

Heavy Petroleum Oils* in Soil Matrix

Summary

The WTPH-418.1 modified method covers the analysis of soil samples containing heavy petroleum oils. The method utilizes either the WTPH-D soil extraction or SW-846, Method 3540; however, both extraction methods require the use of Freon 113, rather than the listed solvent, in order to conduct infrared analysis. The extract is then subjected to the analytical procedure outlined in EPA Method 418.1 and the reporting limit is 100 mg/kg on a dry weight basis.

Apparatus and Materials

Infrared (IR) Spectrometer, Scanning or Fixed Wavelength
IR Cells: 10 mm, 50 mm, IR Grade Glass
Magnetic Stirrer
Teflon Coated Stir Bars
Silica Gel, 60-200 Mesh, Davidson Grade 950 or Equivalent
Freon 113 (1,2,2-trichloro-1,2,2-trifluoroethane)
Filter Paper, Whatman No. 40, 11 cm
Funnel, Glass (Sufficient Diameter To Support the Filter Paper)

Standards

<u>Reference Oils</u>. Pipet 15 mL n-hexadecane, 15 mL isooctane and 10 mL chlorobenzene into a 50 mL glass vial with a Teflon coated septum/screw cap. Keep the container sealed and in a refrigerator except when withdrawing aliquots.

<u>Stock Standard</u>. Pipet 1 mL of reference oil into a tared volumetric flask (100 or 200 mL), reweigh to obtain the mass per volume concentration, then dilute to volume with Freon 113 and stopper. Invert the flask several times to mix the contents.

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* Heavy Petroleum Oils include but are not limited to lubricating oils, fuel oil #4-6 and Bunker C.

Working Standard. Pipet appropriate volumes of stock standard into 25 mL volumetric flasks, according to the cell path length being used, to produce at least five standards encompassing the entire calibration range for the cell path length being used.

Petroleum mixtures identified with WTPH-HCID may be used for calibration in place of the reference oil and the standard production follows the same procedure as the reference oil.

Sample Extraction

Weigh 20 grams of soil and 20 grams of anhydrous sodium sulfate into a 150 mL beaker and mix well with a spatula. The mixture should have a grainy texture. If it forms a large clump, add more anhydrous sodium sulfate and grind to a grainy texture. At this point the soil/sodium sulfate mixture can be extracted by soxhlet via Method 3540 or sonication via Method 3550 with Freon 113. For soxhlet add the soil/sodium sulfate mixture to a soxhlet thimble and soxhlet using 100 mL of Freon 113 in a 125 mL Erlenmeyer flask for 8 hours minimum. Place this extract into a 100 mL volumetric flask. For sonication add 30 mL of Freon 113 to the soil/sodium sulfate mixture in the 150 mL beaker and sonicate for 3 minutes as written in Method 3550. The use of an ultrasonic bath in place of the horn sonicator is not permitted. Allow the Freon 113/soil/sodium sulfate mixture to settle and decant the solvent off through solvent wetted filter paper into a 100 mL volumetric flask. Perform this extraction twice more using 30 mL of Freon each time. Add these extracts to the flask in the same manner as the first extract. Rinse the filter paper with 10 mL of Freon and add this to the 100 mL flask. Bring to volume with Freon 113.

Regardless of which extraction is performed, extract at least one sample duplicate per 10 samples (10% QC) and for each extraction day, at least one method blank (5% QC) per 10 samples. The extraction and preparation of the method blank must be identical to the samples except that no soil is used.

Determine the % solids of the soil for use in the final calculations.

Mix the 100 mL volumetric flask well and discard approximately 10 mL of the sample and add 3 grams of silica gel and stirring bar. Stopper the flask and stir the solution for a minimum of 5 minutes on a magnetic stirrer. To ensure that the capacity of silica gel has not been exceeded a second treatment with 3 grams of silica gel is recommended.

Select the appropriate working standards and cell path lengths accordingly.

Path Length	Range
10 mm	2 - 40 mg
50 mm	0.5 - 3 mg
100 mm	0.1 - 4 mg

Calibrate the IR using the appropriate working standards at five standard levels. Determine absorbance directly for each solution at the absorbance maximum at about 2930 cm^{-1}, and prepare a calibration plot of absorbance vs. mg TPH per 100 mL of standard solution.

After the silica gel has settled in the sample extracts, fill the cleaned sample cell with solution and determine the absorbance of the solution. If the absorbance exceeds 0.8, prepare an appropriate dilution and repeat the determination. Determine the concentration of TPH in the extract by comparing the response against the calibration plot.

Calculations

Calculate TPH in the sample as follows:

$$TPH,\ mg/kg = \frac{R \ x \ dilution \ factor}{W \ x \ S}$$

where

R	=	mg of TPH as determined from the calibration plot
W	=	sample weight in kg
S	=	decimal % solids

The calibration plot values must produce a curve which does not vary from the known values by more than $\pm$10%. Prior to analyses, the validity of the calibration must be checked by analysis of a prepared mid-range standard which also must not vary by more than $\pm$10% from the known value. If the calibration check exceeds $\pm$10%, then a new calibration plot must be produced.

Bibliography

1. EPA Method 418.1.
2. EPA Draft Method 9073.
3. EPA Method 3540 and 3550.

Appendix I-6

Concrete Sampling Plan

Revised PRMOD8-2

Sampling Plan for RCRA Part B Closure

Pier 91
Containment Pad & Oil/Water Separator Sampling and Analysis

Sampling Site: Pier 91 Facility:
- Small Yard (Tank 109-112, 164 area)
- Trunk Load/Unload Pad
- Oil/Water Separator Unit

Address: Pier 91 Facility
Building 19, Box C-105
2001 West Garfield Street
Seattle WA 98119

Description of Sample: Decontaminated concrete containment pad and concrete pit.

Objective: Verify decontamination of the concrete surface of secondary containment areas, related sumps, and oil/water separator pit by sampling and analysis.

Equipment:

Sampling tools: electric chipping tool, extension cord, chisel, hammer, sorbent pads, sample jars, ice coolers

PPE: hard hat, face shield, safety glasses, gloves

Procedures:

Sampling: The electric chipping toll, or a chisel and hammer, will be used to chip the concrete sample location to a depth of 1/2 inch. Approximately, a 4" x 4" area of concrete will need to be chipped to fill the sample. The concrete pieces will be less than 1/2 inch in diameter to ensure proper analysis of the sample.

Samples: An 8 oz. glass jar will be used for each sampling point. The glass jar will be labeled and placed in a cooler with ice. The cooler and samples will be submitted with chain of custody to the laboratory at the end of each sampling day.

Analytical: Each sample will be analyzed for semi-volatiles, total metals, BTEX, PCBs, and total petroleum hydrocarbons.

Small Yard:

A total of seven (7) samples, including biased and random, will be taken from the RCRA tank farm. See the attached map for an overview of the sample locations.

Biased samples, which total five (5), will be taken from the concrete bottom of the sumps, or next to the sump if a sample from the bottom is not attainable. The biased sample locations and associated sample identification are as follows:

Area under Tank 164	RCRAS-1
Valve sump for Tank 109	RCRAS-2
Valve sump for Tank 110	RCRAS-3
Valve sump for Tank 111	RCRAS-4
Valve sump for Tank 112	RCRAS-5

Random samples are taken one for every 3,000 sq. ft. of secondary containment area. The Small Yard will have two (2) random sample locations which are determined as follows:

1. The total square footage of the secondary containment yard, including areas occupied by tanks, is divided into one square foot areas. The containment yard has 7,200 square feet. So, the yard is divided into 90 one foot columns (along the east side) and 80 one foot rows (along the north side). Note that the numbers used in these calculations were estimated from a facility site plan.
2. Column 1, Row 1 is the NE corner square foot.
3. A table of Random Digits[i] is utilized to determine which square foot to check to determine if it is an applicable sampling point (i.e. some random points may be occupied by a tank). Column 17 was chosen at random as the first two digits with the next column (18) as the last two digits.
4. Beginning at the top of the column, each number less than 7,200 is changed into a number equivalent to rows and columns and checked to see if it is an applicable sampling location. The sampling points are then verified with field measurements.
5. This process is repeated until the 2 sample locations are finalized.

Table 1. Small Yard

Random No.	Row No.	Column No.	Comments	Sample I.D.
0130	2	40	No, out of contained area	
3830	**43**	**50**	**OK - Sample #1**	**RCRAR-1**
2779	**31**	**79**	**OK - Sample #2**	**RCRAR-2**

Truck Load/Unload Pad:

A total of two (2) samples, with the possibility of up to two (2) additional samples, will be taken from the truck load/unload pad. See the attached map for an overview of the sample locations.

One (1) biased sample will be taken from the concrete bottom of the only sump in the area, or next to the sump if a sample from the bottom is not attainable. The biased sample will be identified as TLUS-1. Also, up to an additional two (2) biased samples may be taken at crack locations, if present, on the truck load/unload pad. These sample locations would be noted on a copy of the facility map and identified as TLUS-2 and TLUS-3.

Random samples are taken one for every 3,000 sq. ft. of containment area. The Truck Load/Unload Pad will have one (1) random sample location which is determined as follows:

1. The total square footage of the containment yard is divided into one square foot areas. The containment yard has 1,080 square feet. So, the yard is divided into 60 one foot columns (along the east side) and 18 one foot rows (along the north side). Note that the numbers used in these calculations were estimated from a facility site plan.
2. Column 1, Row 1 is the NE corner square foot.
3. A table of Random Digits[ii] is utilized to determine which square foot to check to determine if it is an applicable sampling point. Column 28 was chosen at random as the first two digits with the next column (29) as the last two digits.
4. Beginning at the top of the column, each number less than 1,080 is changed into a number equivalent to rows and columns and checked to see if it is an applicable sampling location. The sampling points are then verified with field measurements.
5. This process is repeated until the sample location is finalized.

Table 2. Truck Load/Unload Area

Random No.	Row No.	Column No.	Comments	Sample I.D.
0790	14	10	Not sloping toward sump	
0698	**12**	**38**	**OK - Sample #1**	**TLUR-1**

Oil/Water Separator Unit:

A total of five (5) samples, selected randomly, were taken from the oil/water separator unit. The locations are described below.

The Oil/Water Separator Unit is a concrete pit with the approximate dimensions of 45' L x 25' W x 10' D. The unit is divided in half lengthwise by an interior concrete wall. Each half is divided by concrete interior walls into four equal sections, or cells.

As discussed with Ecology, four (4) samples should be from walls and one (1) from the floor. To obtain an appropriate representation of the unit, two walls, one interior and one exterior, in each division were sampled. The wall samples were taken 2-4 feet from the ground. The unit did not have a low point, so the floor sample location was chosen at random. Each of the five (5) samples were taken out of different cells. The wall samples are identified as OWSEP-1 to OWSEP-4 and the floor sample is identified as OWSEP-5.

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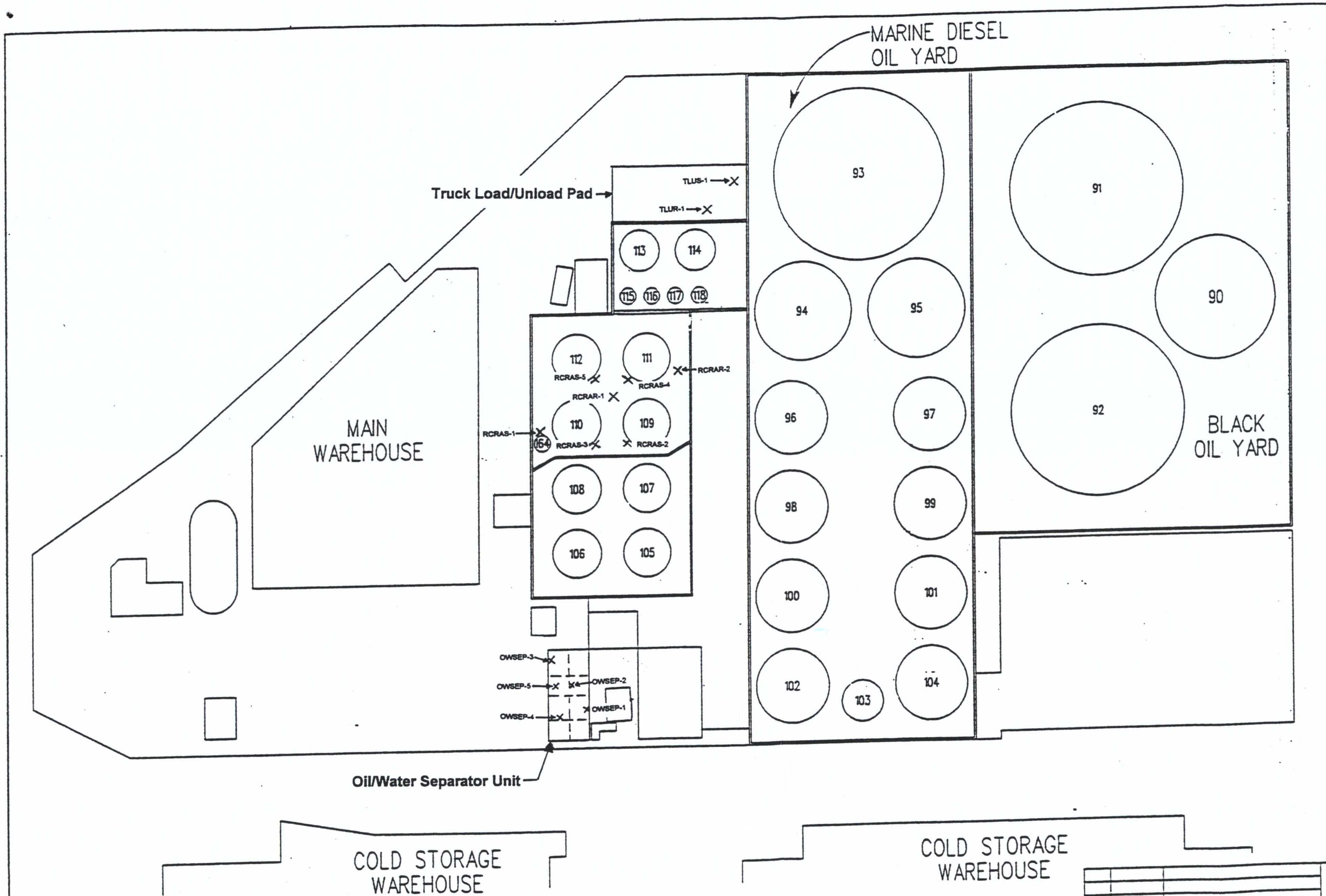
[i] Bolz, Ray E. and Tuve, George L., CRC Handbook of Tables for Applied Engineering Science, 1976, pp. 879.

[ii] Bolz, Ray E. and Tuve, George L., CRC Handbook of Tables for Applied Engineering Science, 1976, pp. 879.



PHILIP ENVIRONMENTAL

SCALE: 1" = 80'-0"	FILE: P91CONC .DGN	DRAWN BY: SAG
DATE: 25JUL95		REVISED:

FIG. II-2, SUMMARY OF CLOSURE

DRAWING NUMBER: P91CONC

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